

FCC TEST REPORT
for
Audio Components International, Inc
REL Wireless Kit
Model Number: AIRSHIP
FCC ID: 2AGTU-AIRSHIP

Prepared for : Audio Components International, Inc
Address : 716 Yarmouth Road, Suite 212 Palos Verdes Estates,
CA 90274, USA

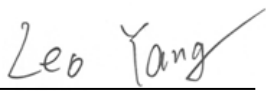
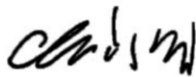
Prepared by : DongGuan Precise testing & Certification Corp. Ltd
Address : Building D, Baoding Technology Park, Guangming Road 2,
Guangming Community, Dongcheng District, Dongguan,
Guangdong, China

Report No. : PTC19090601701-FC01
Date of Test : Sep. 01 ~ 19, 2019
Date of Report : Sep. 20, 2019

TABLE OF CONTENTS

Test Report Declaration	Page
1. TEST SUMMARY	4
2. GENERAL PRODUCT INFORMATION	4
2.1 Product Function.....	4
2.2 Description of Device (EUT)	4
2.3 Channel List	4
2.4 Independent Operation Modes.....	5
2.5 Test Supporting System	5
2.6 TEST FACILITY.....	5
2.8 List of Test and Measurement Instruments	6
3. TEST SET-UP AND OPERATION MODES	7
3.1 Principle of Configuration Selection.....	7
3.2 Block Diagram of Test Set-up.....	7
3.3 Special Accessories and Auxiliary Equipment.....	7
3.4 Countermeasures to Achieve EMC Compliance	7
4. EMISSION TEST RESULTS	8
4.1 Conducted Emission at the Mains Terminals Test.....	8
4.2 Radiated Emission Test.....	11
5. BAND EDGE COMPLIANCE TEST	17
5.1 Limits	17
5.2 Test setup	17
5.3 Test Data	17
6. BANDWIDTH TEST	19
6.1 Applicable Standard	19
7. OUTPUT POWER TEST	22
7.1 Limits	22
7.2 Test setup	22
7.3 Test result.....	22
8. PEAK POWER SPECTRAL DENSITY TEST	24
8.1 Limits	24
8.2 Test setup	24
8.3 Test data	24
9. FREQUENCY STABILITY TEST	26
9.1 Limit	26
9.2 Test Configuration	26
9.3 Test procedure	26
9.4 Test data	26
10. ANTENNA REQUIREMENTS.....	27
10.1 Limits	27
10.2 Result	27
11. PHOTOGRAPHS OF TEST SET-UP	28

DongGuan Precise testing & Certification Corp. Ltd

Applicant:	Audio Components International, Inc.		
Address:	716 Yarmouth Road, Suite 212 Palos Verdes Estates, CA 90274, USA		
Manufacturer:	Audio Components International, Inc.		
Address:	716 Yarmouth Road, Suite 212 Palos Verdes Estates, CA 90274, USA		
E.U.T:	REL Wireless Kit		
Model Number:	AIRSHIP		
Trade Name:	REL	Serial No.:	-----
Date of Receipt:	Sep. 01, 2019	Date of Test:	Sep. 01 ~ 19, 2019
Test Specification:	FCC Rules and Regulations Part 15 Subpart E Section 15.407 ANSI C63.10: 2013		
Test Result:	The equipment under test was found to be compliance with the requirements of the standards applied.		
	Issue Date: Sep. 20, 2019		
	Prepared by:	Reviewer by:	
	 Leo Yang / Engineer	 Chris Du / Manager	
Other Aspects:	None.		
<i>Abbreviations: OK/P=passed fail/F=failed n.a/N=not applicable E.U.T=equipment under tested</i>			
<i>This test report is based on a single evaluation of one sample of above mentioned products. It is not permitted to be duplicated in extracts without written approval of DongGuan Precise testing & Certification Corp. Ltd</i>			

1. TEST SUMMARY

Test Items	Test Requirement	Result
Conducted Emissions	15.207	PASS
Radiated Emissions	15.407(b), 15.209	PASS
Occupied Bandwidth	15.407(e)	PASS
Power Density	15.407 (a)	PASS
Maximum Peak Output Power	15.407 (a)	PASS
Emissions from out of band	15.407 (b)	PASS
Frequency Stability	15.407 (g)	PASS
Antenna Requirement	15.203	PASS

2. GENERAL PRODUCT INFORMATION

2.1 Product Function

Refer to Technical Construction Form and User Manual.

2.2 Description of Device (EUT)

Product Name:	REL Wireless Kit
Model No.:	AIRSHIP
Operation Frequency:	5.736GHz~5.814GHz
Channel Numbers:	3 Channel
Modulation Technology:	QPSK (DSSS)
Antenna Type:	PCB ANT
Antenna Gain:	ANT A:2.4dBi ANT B:2.4dBi
Directional Gain	$2.4+10*\log(2)=5.41\text{dBi}$
Adapter Information:	Mode: GQ05-050050-CV Input: 100-240V~, 50/60Hz, 0.3A Max Output: 5V $\overline{\text{---}}$,500mA

2.3 Channel List

Channel	Frequency (MHz)
01	5736
02	5762
03	5814

2.4 Independent Operation Modes

The basic operation modes are:

2.4.1 EUT work TX mode, and frequency as below:

Channel	Frequency
Low	5736
Middle	5762
High	5814
Test SW Version:	DRTU Version 1.7.7-02972

2.5 Test Supporting System

Antenna A/ B are transmitting, two antennas simultaneously transmit. And the worst data is recorded for radiated emission and band edge.

For MIMO mode , Directional gain= $GANT + 10\log(N)dbi = 5.41dbi$

The EUT has MIMO mode.

2.6 TEST FACILITY

Test Firm: DongGuan Precise testing &Certification Corp. Ltd

Address: Building D, Baoding Technology Park, Guangming Road 2, Guangming

Community, Dongcheng District, Dongguan, Guangdong, China

FCC Registration Number: 790290

A2LA Certificate No.: 4408.01

IC Registration Number: 12191A-1

2.8 List of Test and Measurement Instruments

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
MXG Signal Analyzer	Keysight	N9020A	MY56070279	Apr. 12,19	Apr. 11, 20
MIMO4TX-1	Keysight	MIMO4TX	TW5451101,TW5451102,TW545110,TW5451104	Apr. 12,19	Apr. 11, 20
MXG Vector Signal Generator	Agilent	N5182A	MY50143410	Apr. 12,19	Apr. 11, 20
MXG Analog Signal Generator	Agilent	N5181B	MY53050432	Apr. 12,19	Apr. 11, 20
Comprehensive tester	R&S	CMW500	106288	Apr. 12,19	Apr. 11, 20
EMI Test Receiver	Rohde&Schwarz	ESCI	101156	Apr. 12,19	Apr. 11, 20
Horn Antenna	DAZE	ZN30701	11003	Apr. 15,19	Apr. 14, 20
Broadband Horn Antenna	SCHWARZBECK	BBHA 9170+AA 9213	866	Dec. 14, 18	Dec. 13, 19
Spectrum Analyzer	Keysight	N9020A	MY56070279	Apr. 12,19	Apr. 11, 20
Realtime Rpectrum Analyzer	R&S	FSVR40	100952	Dec. 7, 18	Dec. 6, 19
3m anechoic Chamber	ETS-LINDGREN	966	170326	Apr. 22,19	Apr. 21, 21
Signal Amplifier	ZHINAN	ZN3380C	11001	Apr. 12,19	Apr. 11, 20
Pre-Amplifier	EMCI	ENMC184045B	980615	Apr. 12,19	Apr. 11, 20
RF Cable	Junkosha	MWX322-1m	1305G006	Apr. 12,19	Apr. 11, 20
RF Cable	Junkosha	MWX322-2m	1305G007	Apr. 12,19	Apr. 11, 20
RF Cable	Junkosha	MWX322-8m	1305G008	Apr. 12,19	Apr. 11, 20
Signal Cable	HUBER+SUHNER	40G-1.5m	18063131	Dec. 12, 18	Dec. 11, 19
Signal Cable	HUBER+SUHNER	40G-2.5m	18063132	Dec. 12, 18	Dec. 11, 19
Signal Cable	HUBER+SUHNER	40G-9.5m	18063133	Dec. 12, 18	Dec. 11, 19
MULTI-DEVICE Controller	ETS-LINDGREN	2090	126913	N/A	N/A
Antenna Holder	ETS-LINDGREN	2070B	00109601	N/A	N/A
TRILOG Broadband Antenna	Schwarzbeck	VULB 9168	00829	Apr. 15,19	Apr. 14, 20

3. TEST SET-UP AND OPERATION MODES

3.1 Principle of Configuration Selection

Emission: The equipment under test (EUT) was configured to measure its highest possible radiation level.
The test modes were adapted accordingly in reference to the Operating Instructions.

3.2 Block Diagram of Test Set-up

System Diagram of Connections between EUT and Simulators

Conducted Emission:



Radiated Emission:



(EUT: REL Wireless Kit)

3.3 Special Accessories and Auxiliary Equipment

Adapter:	Mode: GQ05-050050-CV Input: 100-240V~, 50/60Hz, 0.3A Max Output: 5V---,500mA
----------	--

3.4 Countermeasures to Achieve EMC Compliance

None.

4. EMISSION TEST RESULTS

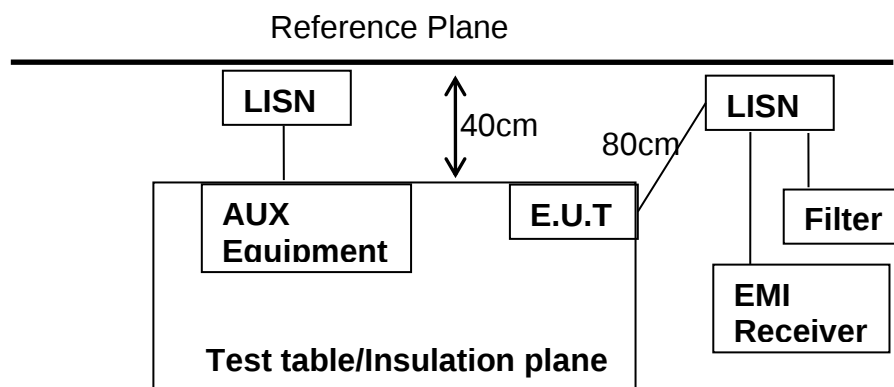
4.1 Conducted Emission at the Mains Terminals Test

4.1.1 Limit 15.207 limits

Frequency MHz	Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56	56 to 46
0.5-5	56	46
5-30	60	50
NOTE: 1.The lower limit shall apply at the transition frequencies. 2.The limit decreases linearly with the logarithm of the frequency in the range 0,15 MHz to 0,50 MHz.		

4.1.2 Test Setup

- 1.The EUT was put on a wooden table which was 0.8 m high above the ground and connected to the AC mains through the Artificial Mains Network (AMN). Where the mains cable supplied by the manufacture was longer than 0.8 m, the excess was folded back and forth parallel to the cable at the center so as to form a bundle no longer than 0.4 m.
- 2.The EUT was kept 0.4 m from any other earthed conducting surface. Both sides of AC line were checked to find out the maximum conducted emission levels according to the test procedure during the conducted emission test.
- 3.The frequency range from 150 kHz to 30 MHz was investigated.
- 4.The bandwidth of the test receiver was set at 9 kHz.
- 5.Pretest for all mode, The test data of the worst case condition(s) was reported on the following page.



Remark: E.U.T. :Equipment Under Test
LISN: Line Impedance Stabilization Network
Test table height: 0.8m

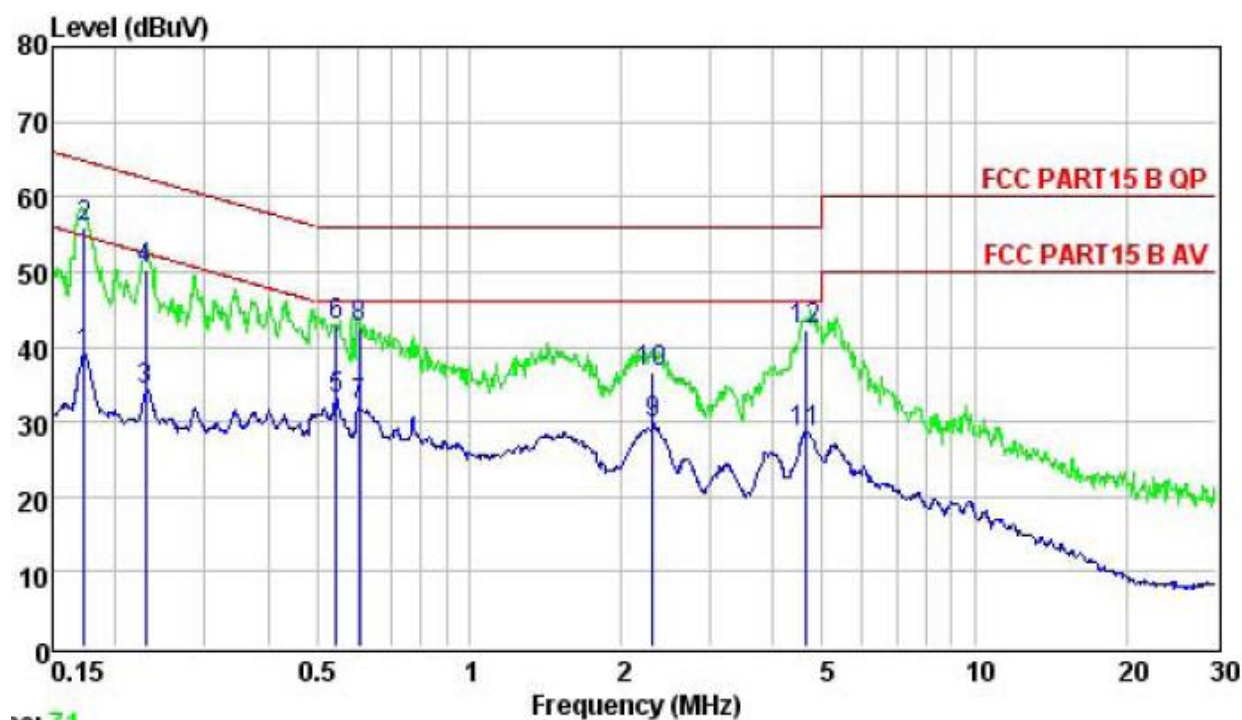
4.1.3 Test Result

Pass

Remark:

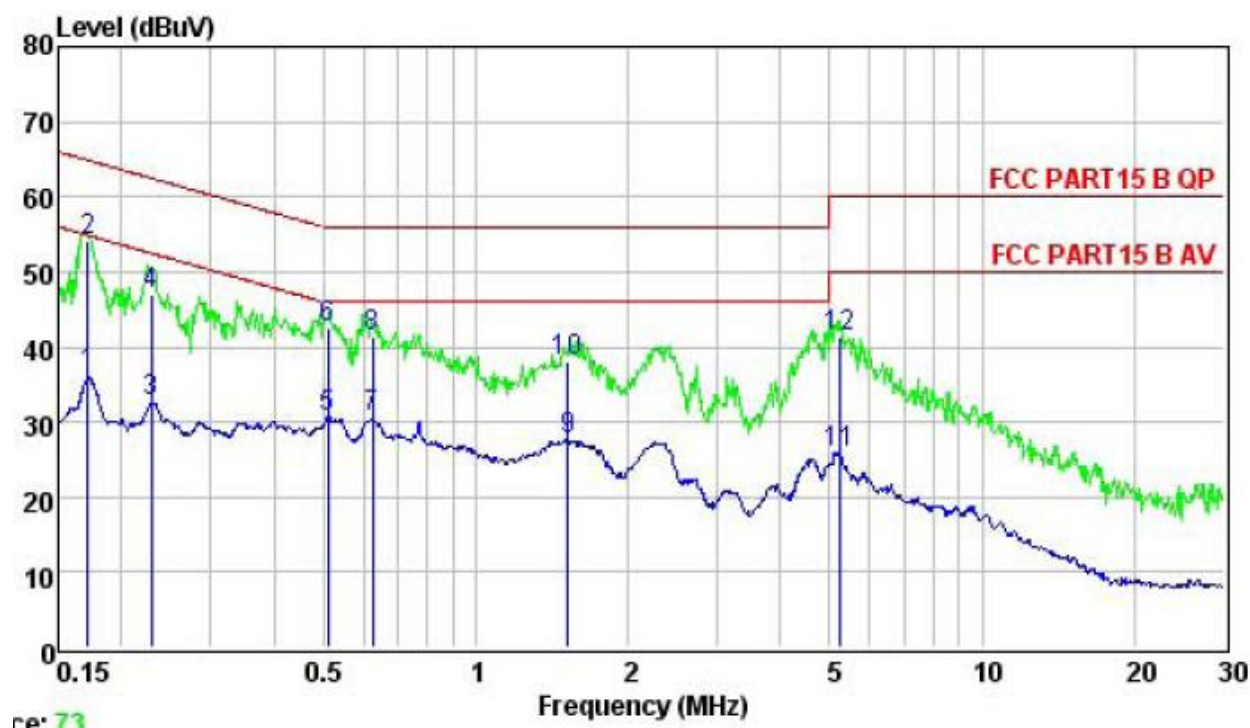
1. All modes were tested at AC 120V and 240V, only the worst result of AC 120V was reported.
2. We tested at Low, Middle, and High channel at the antenna single and antenna combination. and recored the worst data at Low channel of Antenna B in the report.

EUT :	REL Wireless Kit	Model Name :	AIRSHIP
Temperature :	26 °C	Relative Humidity :	54%
Pressure :	1010hPa	Phase :	Live
Test Voltage :	120V/60Hz	Test Mode :	Low Channel of ANT B



	Freq	Level	Limit	Over	Remark
	MHz	dBuV	Line	Limit	
			dBuV	dB	
1	0.173	38.89	54.81	-15.92	Average
2	0.173	56.00	64.81	-8.81	QP
3	0.229	34.34	52.48	-18.14	Average
4	0.229	50.14	62.48	-12.34	QP
5	0.546	32.92	46.00	-13.08	Average
6	0.546	42.85	56.00	-13.15	QP
7	0.608	32.04	46.00	-13.96	Average
8	0.608	42.56	56.00	-13.44	QP
9	2.309	29.62	46.00	-16.38	Average
10	2.309	36.58	56.00	-19.42	QP
11	4.647	28.59	46.00	-17.41	Average
12	4.647	42.36	56.00	-13.64	QP

EUT :	REL Wireless Kit	Model Name :	AIRSHIP
Temperature :	26 °C	Relative Humidity :	54%
Pressure :	1010hPa	Phase :	Neutral
Test Voltage :	AC 120V/60Hz	Test Mode :	Low Channel of ANT B



	Freq	Level	Limit	Over	Remark
	MHz	dBuV	Line	Limit	
			dBuV	dB	
1	0.171	36.18	54.90	-18.72	Average
2	0.171	53.99	64.90	-10.91	QP
3	0.229	32.59	52.48	-19.89	Average
4	0.229	46.99	62.48	-15.49	QP
5	0.510	30.78	46.00	-15.22	Average
6	0.510	42.58	56.00	-13.42	QP
7	0.627	30.68	46.00	-15.32	Average
8	0.627	41.25	56.00	-14.75	QP
9	1.519	27.60	46.00	-18.40	Average
10	1.519	38.10	56.00	-17.90	QP
11	5.249	25.86	50.00	-24.14	Average
12	5.249	41.26	60.00	-18.74	QP

4.2 Radiated Emission Test

4.2.1 Limit 15.209 limits

Frequency MHz	Distance Meters	Filed Strengths Limit	
		μV/m	dB(μV)/m
30~88	3	100	40.0
88~216	3	150	43.5
216~960	3	200	46.0
960~1000	3	500	54.0
Above 1000	3	74.0dB(μV)/m(Peak) 54.0dB(μV)/m(Average)	

4.2.2 Restricted bands of operation

MHz	MHz	MHz	GHz
0.009-0.110	16.42-16.423	399.9-410	4.5-5.15
0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	
All the emissions appearing within 15.205 restricted frequency bands shall not exceed the limits shown in 15.209,all the other emissions shall be at least 20dB below the fundamental emissions, or comply with 15.209 limits.			

4.2.3 Test setup

The EUT was placed on a turn table which was 0.8 m (above 1GHz, the high was 1.5m) above the ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was set 3 m away from the receiving antenna which was mounted on an antenna tower. The measuring antenna moved up and down to find out the maximum emission level. It moved from 1 m to 4 m for both horizontal and vertical polarizations.

The EUT was tested in the Chamber Site. It was pre-scanned with a Peak detector from the spectrum, and all the final readings from the test receiver were measured with the Quasi-Peak detector.

The bandwidth of the EMI test receiver is set at 120kHz for frequency range from 30MHz to 1000 MHz.

The bandwidth of the Spectrum's VBW is set at 3MHz and RBW is set at 1MHz for peak emissions measurement above 1GHz and 1MHz RBW, 10Hz VBW for average emissions measure above 1GHz, Both PK and AV measure, PK detector is used.

The frequency range from 30MHz to 10th harmonic are checked. and no any emissions were found from 18GHz to 40 GHz, So the radiated emissions from 18GHz to 40GHz were not record.

Notes: 1. Emission Level = Antenna Factor + Cable Loss + Meter Reading - Preamp Factor.

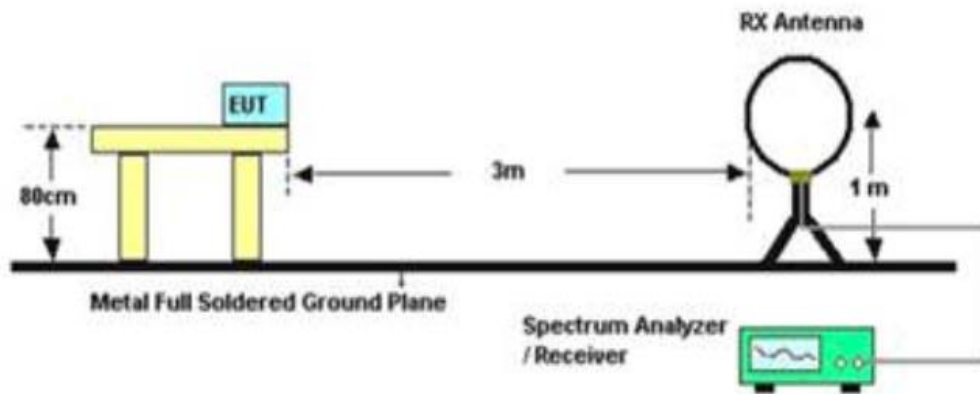
2. Measurement Uncertainty: ± 3.2 dB at a level of confidence of 95%.

3. For emissions above 1GHz, if peak level comply with average limit, then the average level is deemed to comply with average limit.

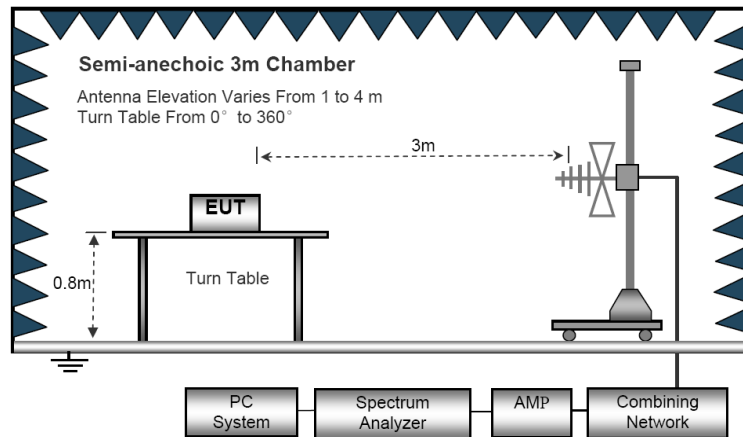
4. For emissions below 1GHz, pretest for all mode, The test data of the worst case condition(s) was reported on the following pages.

5. For Both PK and AV value above 1GHz, PK detector is used.

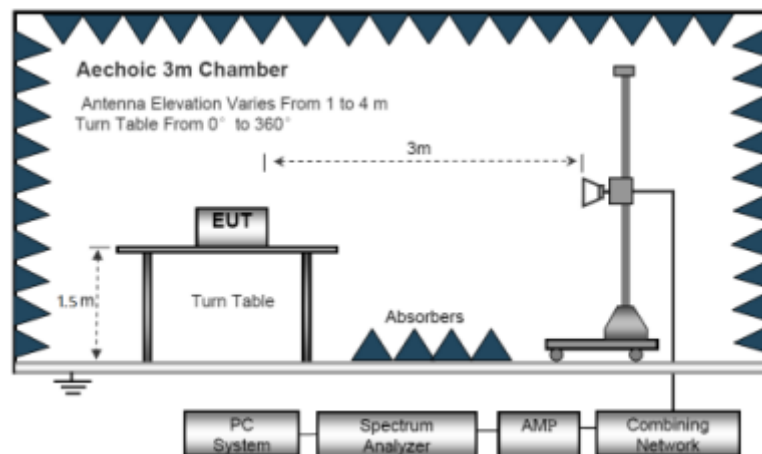
Radiated Emission Test-Up Frequency Below 30MHz



Radiated Emission Test-Up Frequency 30MHz- 1GHz



Above 1GHz



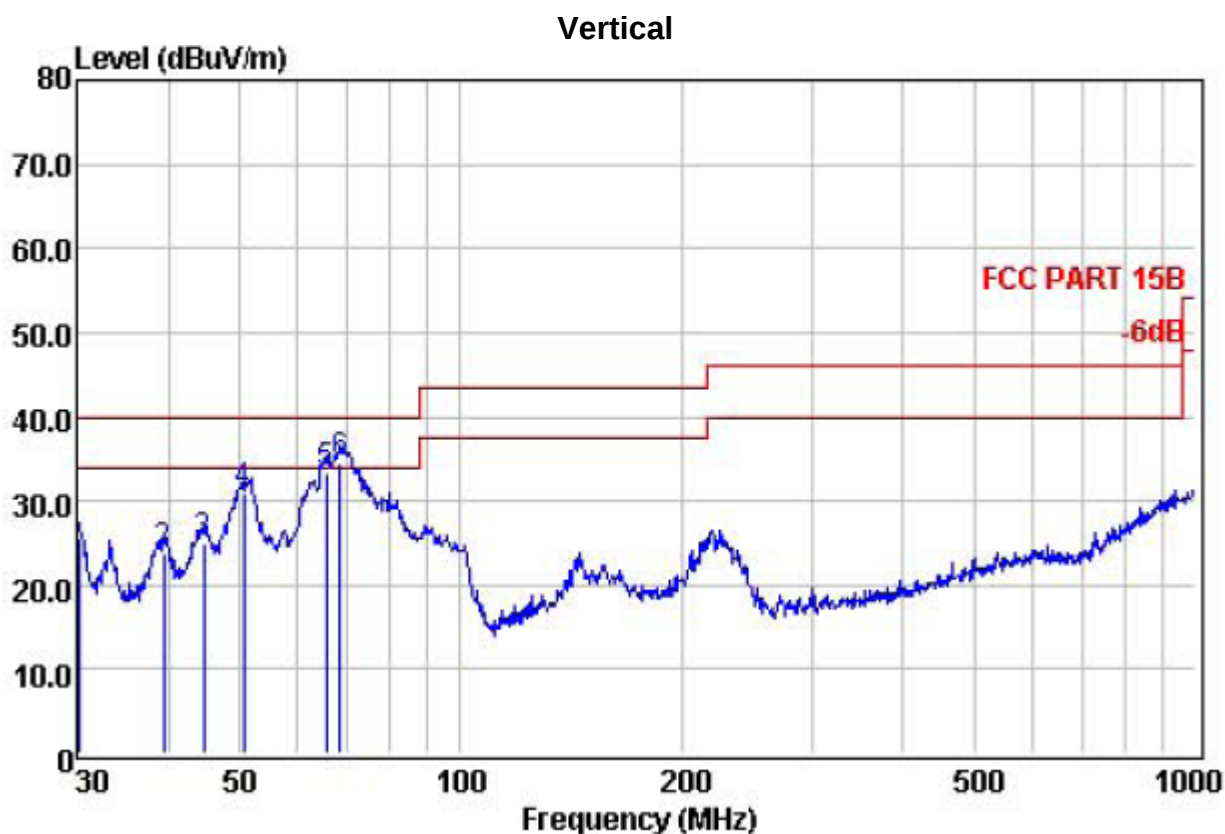
4.2.4 Test Result

Pass

Remark:

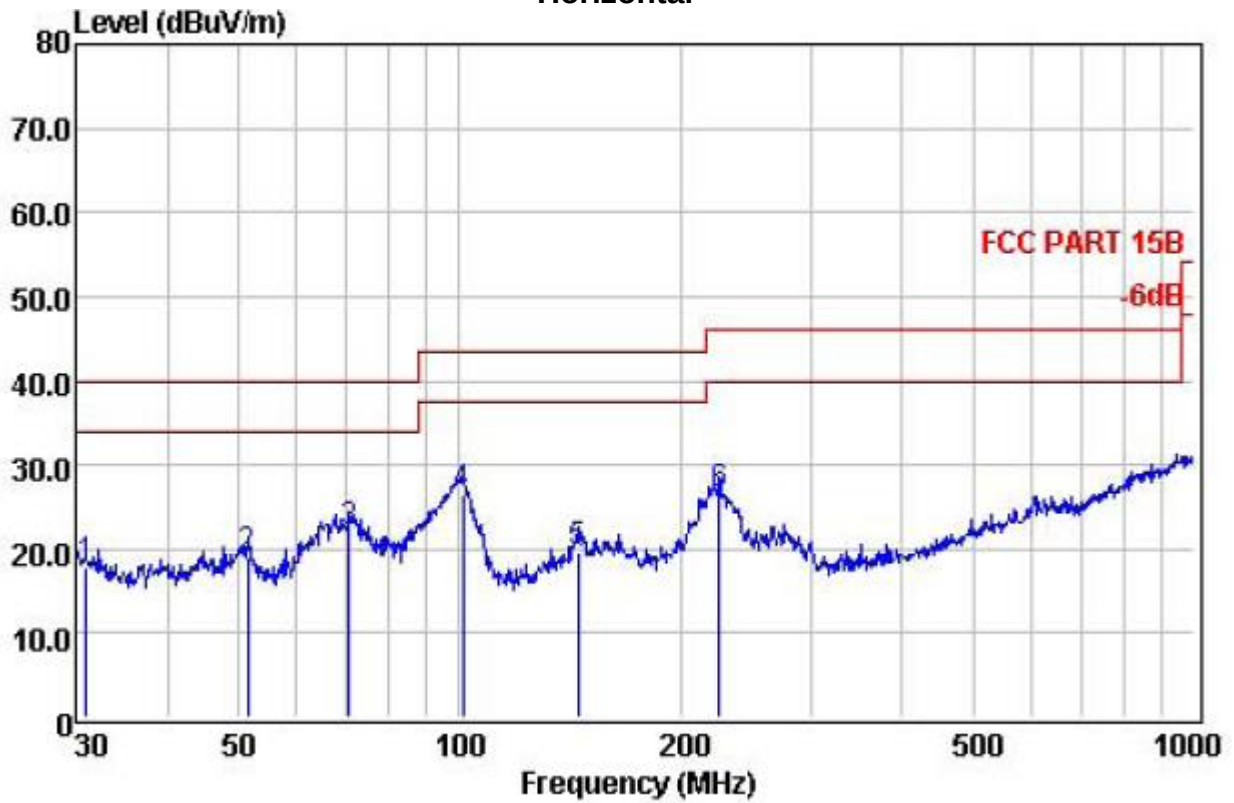
3. All modes were tested at AC 120V and 240V, only the worst result of AC 120V was reported.
4. We tested at Low, Middle, and High channel at the antenna single and antenna combination. and recored the worst data at Low channel of Antenna B in the report.

Below 1GHz			
EUT :	REL Wireless Kit	Model Name :	AIRSHIP
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010hPa	Test Mode :	Low Channel of ANT B
Test Voltage :	AC 120V/60Hz		



	Freq	Read Level	Antenna Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dBuV/m	dBuV/m	dB	
1	30.21	10.43	14.71	0.34	25.48	40.00	-14.52	QP
2	39.44	10.22	13.43	0.14	23.79	40.00	-16.21	QP
3	44.74	11.72	13.25	0.12	25.09	40.00	-14.91	QP
4	50.59	17.84	12.94	0.12	30.90	40.00	-9.10	QP
5	65.57	21.40	11.84	0.14	33.38	40.00	-6.62	QP
6 !	68.39	22.49	11.82	0.14	34.45	40.00	-5.55	QP

Horizontal



	Freq	ReadAntenna Level	Antenna Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dBuV/m	dBuV/m	dB	
1	30.96	3.14	14.39	0.32	17.85	40.00	-22.15	QP
2	51.48	6.09	12.83	0.12	19.04	40.00	-20.96	QP
3	70.58	9.10	12.82	0.14	22.06	40.00	-17.94	QP
4	100.93	15.08	11.26	0.17	26.51	43.50	-16.99	QP
5	144.84	4.11	15.33	0.23	19.67	43.50	-23.83	QP
6	226.10	14.32	11.79	0.40	26.51	46.00	-19.49	QP

NOTE: 1. Absolute Level= Reading Level+antenna Factor+cable loss - Preamp factor,
 2. Over Limit= Absolute Level – Limit;
 3. Mode 1 is the worst mode. Only worst case is presented in the report .

Above 1GHz									
EUT :		REL Wireless Kit			Model Name :		AIRSHIP		
Temperature :		20 °C			Relative Humidity :		48%		
Pressure :		1010hPa			Test Voltage :		AC 120V/60Hz		
Record the worst test data for Antenna B in report									
Frequency	Meter Reading	Antenna Factor	Cable loss	Preamp factor	Emission Level	Limits	Margin	Detector Type	Comments
(MHz)	(dBμV)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		
TX-5736									
11472	30.47	23.87	21.62	28.95	47.01	54	-6.99	Average	Vertical
11472	42.25	23.87	21.62	28.95	58.79	74	-15.21	peak	Vertical
17208	24.14	24.92	24.48	30.18	43.36	54	-10.64	Average	Vertical
17208	35.65	24.92	24.48	30.18	54.87	74	-19.13	peak	Vertical
11472	30.41	23.87	21.62	28.95	46.95	54	-7.05	Average	Horizontal
11472	42.35	23.87	21.62	28.95	58.89	74	-15.11	peak	Horizontal
17208	24.33	24.92	24.48	30.18	43.55	54	-10.45	Average	Horizontal
17208	35.18	24.92	24.48	30.18	54.40	74	-19.60	peak	Horizontal
TX-5762									
11524	28.57	23.88	21.64	28.95	45.14	54	-8.86	Average	Vertical
11524	41.48	23.88	21.64	28.95	58.05	74	-15.95	peak	Vertical
17286	25.35	25.05	24.52	30.22	44.70	54	-9.30	Average	Vertical
17286	34.71	25.05	24.52	30.22	54.06	74	-19.94	peak	Vertical
11524	28.42	23.88	21.64	28.95	44.99	54	-9.01	Average	Horizontal
11524	41.44	23.88	21.64	28.95	58.01	74	-15.99	peak	Horizontal
17286	25.24	25.05	24.52	30.22	44.59	54	-9.41	Average	Horizontal
17286	34.51	25.05	24.52	30.22	53.86	74	-20.14	peak	Horizontal
TX-5814									
11628	27.32	25.78	21.71	30.18	44.63	54	-9.37	Average	Vertical
11628	39.91	25.78	21.71	30.18	57.22	74	-16.78	peak	Vertical
17442	22.72	27.29	24.59	30.28	44.32	54	-9.68	Average	Vertical
17442	32.60	27.29	24.59	30.28	54.20	74	-19.80	peak	Vertical
11628	27.32	25.78	21.71	30.18	44.63	54	-9.37	Average	Horizontal
11628	39.81	25.78	21.71	30.18	57.12	74	-16.88	peak	Horizontal
17442	22.24	27.29	24.59	30.28	43.84	54	-10.16	Average	Horizontal
17442	32.49	27.29	24.59	30.28	54.09	74	-19.91	peak	Horizontal
NOTE:1.Absolute Level= ReadingLevel+antenna Factor+cable loss-preamplifier factor. 2.Over Limit= Absolute Level – Limit. 3.The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has not to be reported. 4.EUT Pre-scan X/Y/Z orientation, only worst case is presented in the report (Z orientation)									

5. BAND EDGE COMPLIANCE TEST

5.1 Limits

For the band 5725-5825 MHz , All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

5.2 Test setup

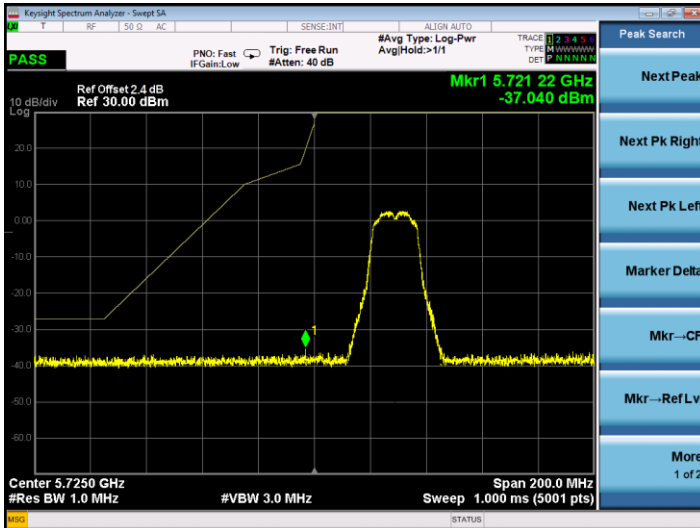
Test method: KDB 789033 D02v02r01& Parts 15.407(b)(4) & 15.209(a)

Same as Clause 4.2.

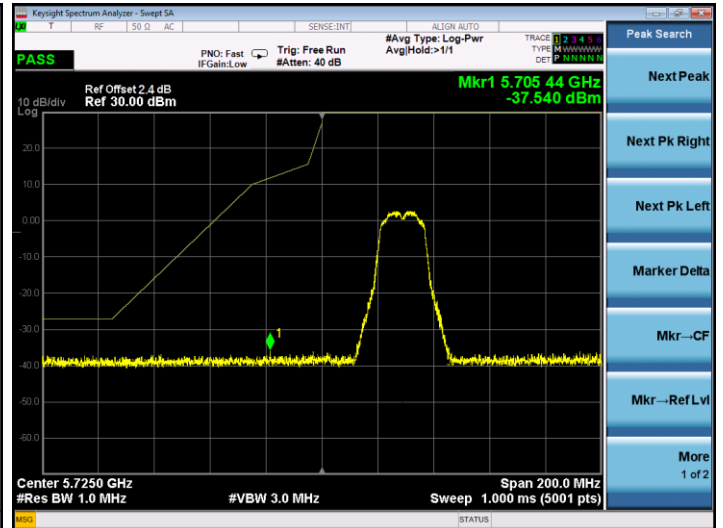
5.3 Test Data

Please see data as below:

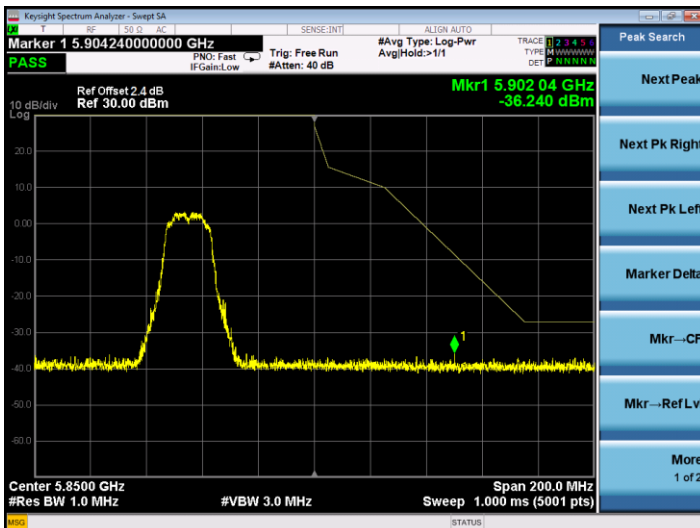
5736MHz-ANTA



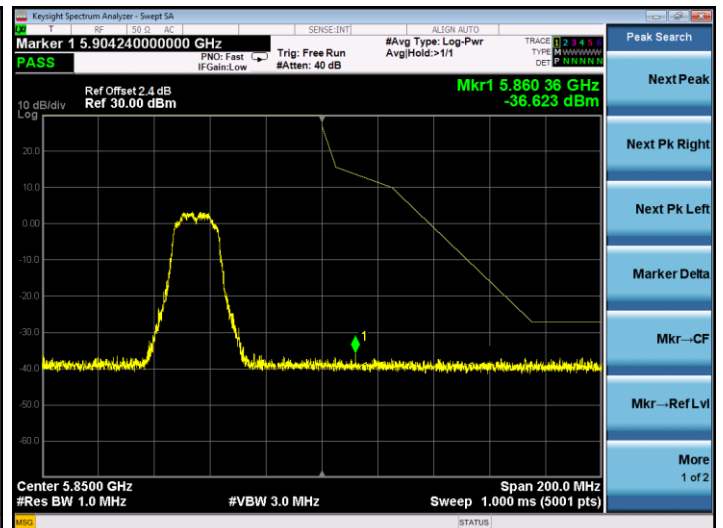
5736MHz-ANTB



5814MHz-ANTA



5714MHz-ANT B



Note: The test results have included the antenna gain

6. BANDWIDTH TEST

6.1 Applicable Standard

The bandwidth at 6 dB down from the highest in-band spectral density is measured with a spectrum analyzer connected to the antenna terminal while the EUT is operating at its maximum power control level, as defined in KDB 789033, at the appropriate frequencies. The spectrum analyzer's bandwidth measurement function is configured to measure the 26 dB bandwidth. The 26 dB bandwidth is used to determine the conducted power limits. The minimum of 6dB Bandwidth measurement is 0.5 MHz for U-NII-3

6.2 Test Procedure

1. Emission Bandwidth (EBW)

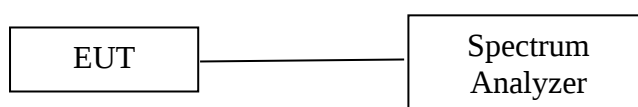
- Set RBW = approximately 1% of the emission bandwidth.
- Set the VBW > RBW.
- Detector = Peak.
- Trace mode = max hold.
- Measure the maximum width of the emission that is 26 dB down from the maximum of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

2. Minimum Emission Bandwidth for the band 5.725-5.85 GHz

Section 15.407(e) specifies the minimum 6 dB emission bandwidth of at least 500 KHz for the band 5.715-5.85 GHz. The following procedure shall be used for measuring this bandwidth:

- Set RBW = 100 kHz.
- Set the video bandwidth (VBW) $\geq 3 \times$ RBW.
- Detector = Peak.
- Trace mode = max hold.
- Sweep = auto couple.
- Allow the trace to stabilize.
- Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

6.3 Test setup



6.4 Test result

Frequency (MHz)	6dB Bandwidth (MHz) ANT A	6dB Bandwidth (MHz) ANT B	Limit (MHz)	99% Bandwidth (MHz) ANT A	99% Bandwidth (MHz) ANT B
5736	9.844	9.843	0.5	13.813	13.753
5762	9.849	9.833	0.5	13.853	13.743
5814	9.844	9.835	0.5	13.868	13.803

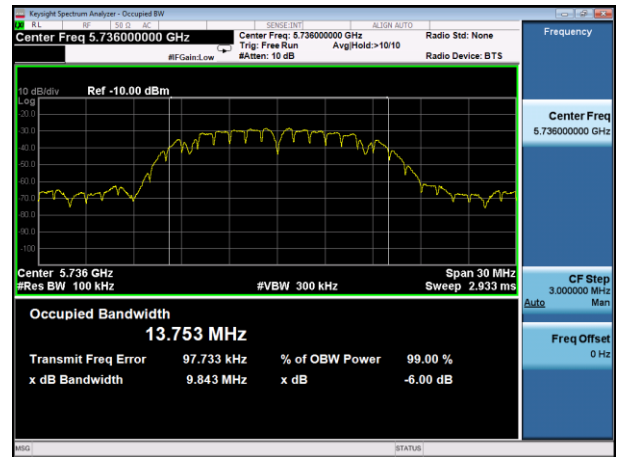
Frequency (MHz)	26dB Bandwidth (MHz) ANT A	26dB Bandwidth (MHz) ANT B	Limit (MHz)
5736	14.250	14.340	0.5
5762	14.630	14.660	0.5
5814	14.270	14.270	0.5

6dB and 99% Bandwidth

5736MHz-ANTA



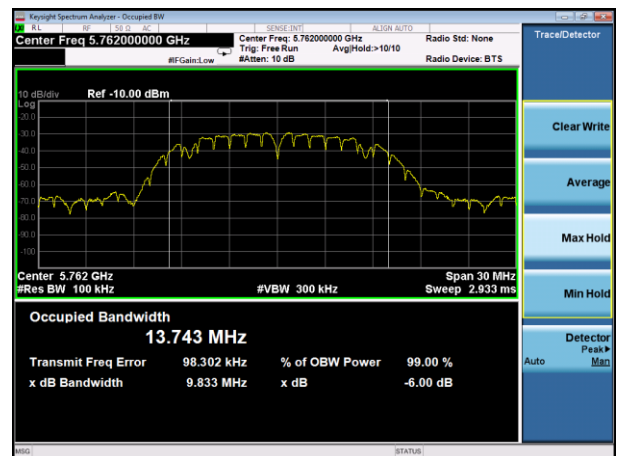
5736MHz-ANTB



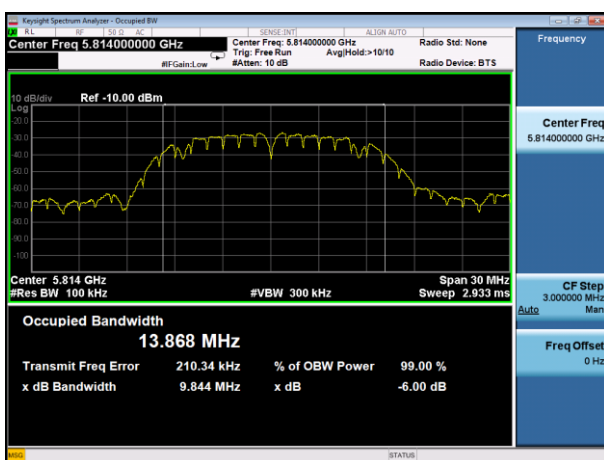
5762MHz-ANTA



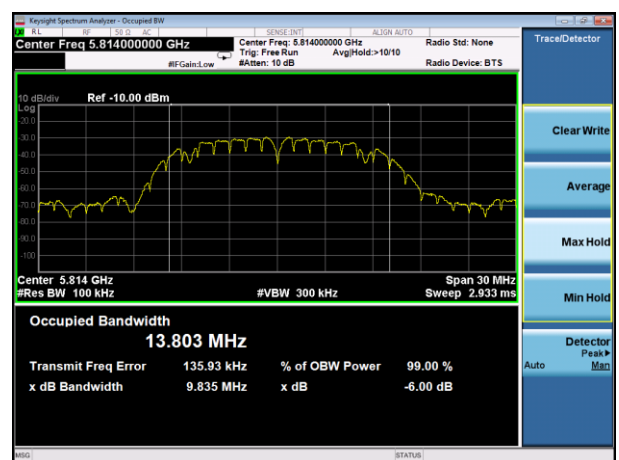
5762MHz-ANT B



5814MHz-ANTA

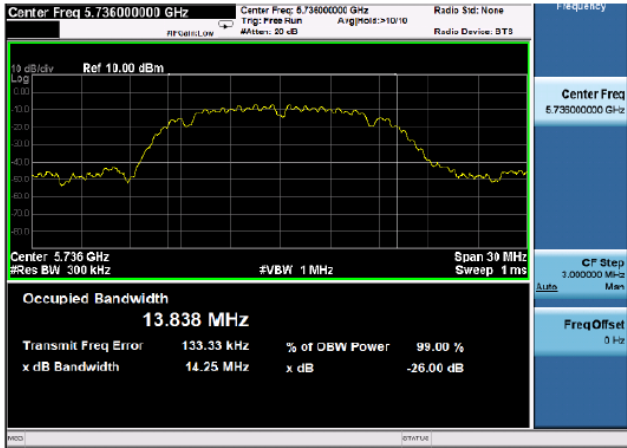


5814MHz-ANT B

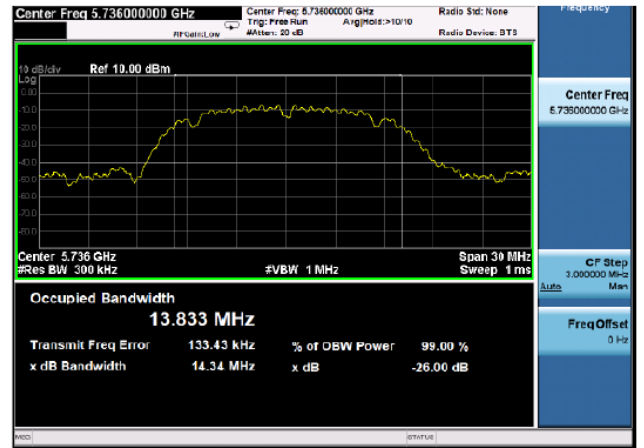


26dB Bandwidth

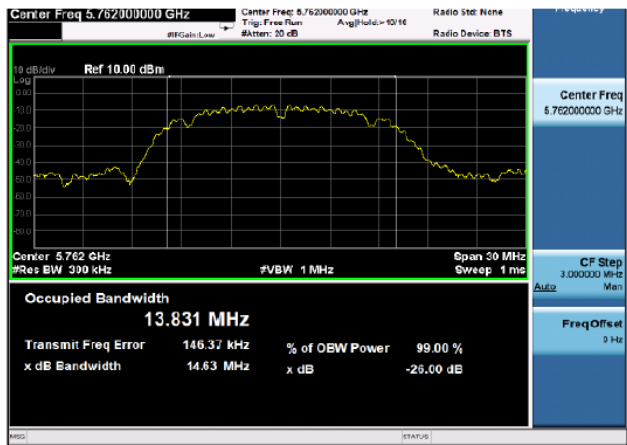
5736MHz-ANTA



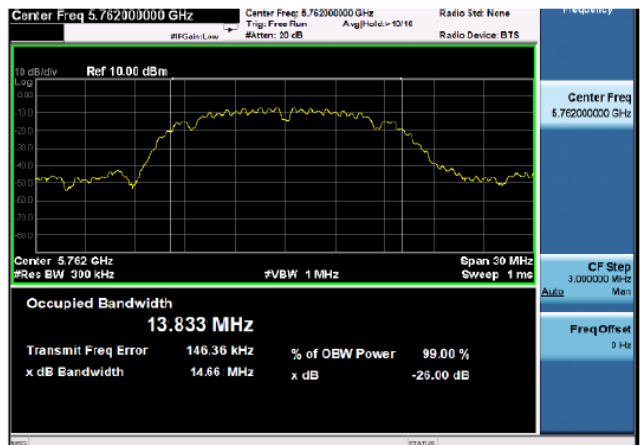
5736MHz-ANT B



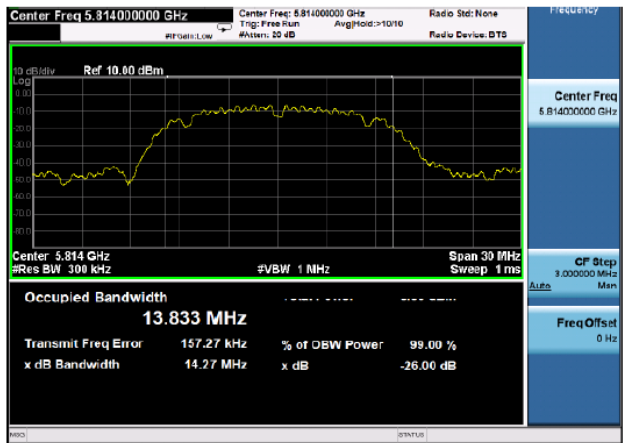
5762MHz-ANTA



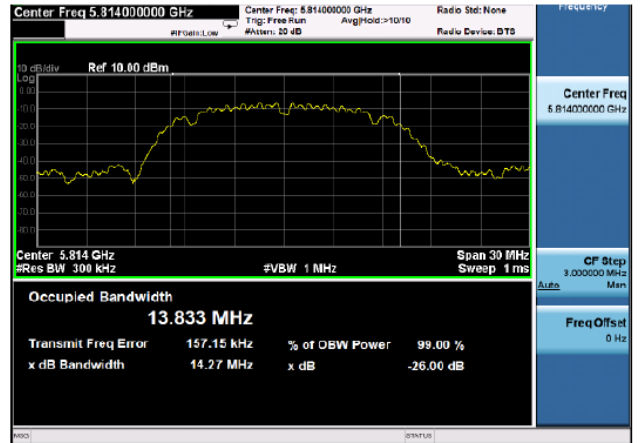
5762MHz-ANT B



5814MHz-ANTA



5814MHz-ANT B



7. OUTPUT POWER TEST

7.1 Limits

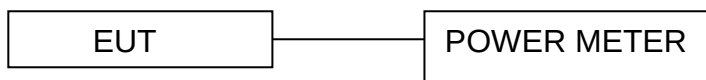
Band 5.725-5.825GHz:

FCC: For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W.

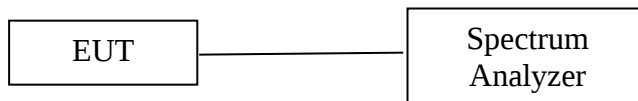
7.2 Test setup

1. The maximum average conducted output power can be measured using Method PM-G (Measurement using a gated RF average power meter):
2. Measurements may be performed using a wideband gated RF power meter provided that the gate parameters are adjusted such that the power is measured only when the EUT is transmitting at its maximum power control level. Since the measurement is made only during the ON time of the transmitter, no duty cycle correction factor is required.
 - a. The Transmitter output (antenna port) was connected to the power meter.
 - b. Turn on the EUT and power meter and then record the power value.
 - c. Repeat above procedures on all channels needed to be tested.

Output Power:



Duty cycle:



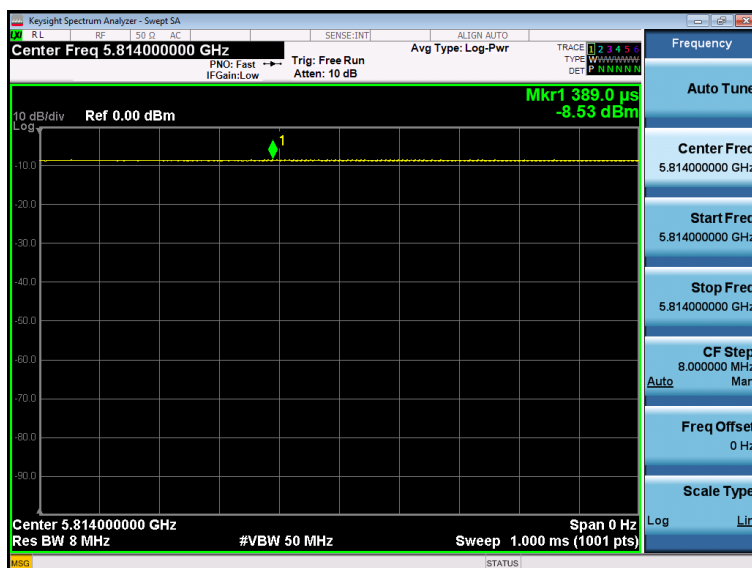
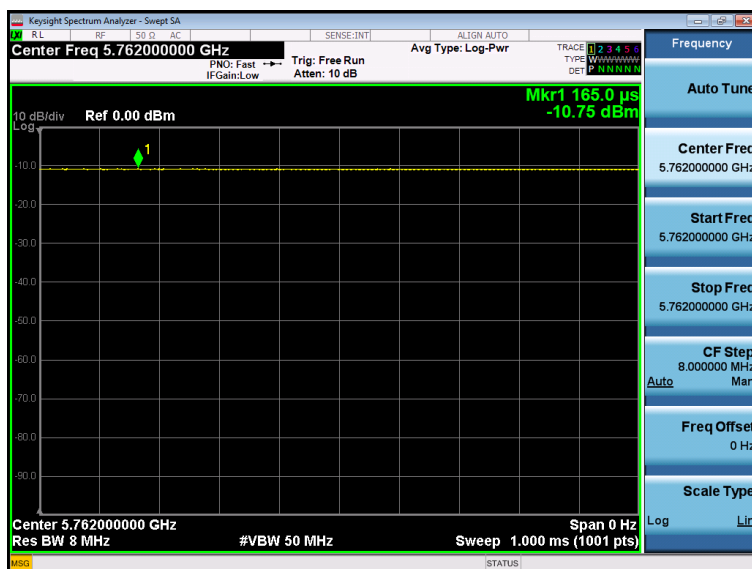
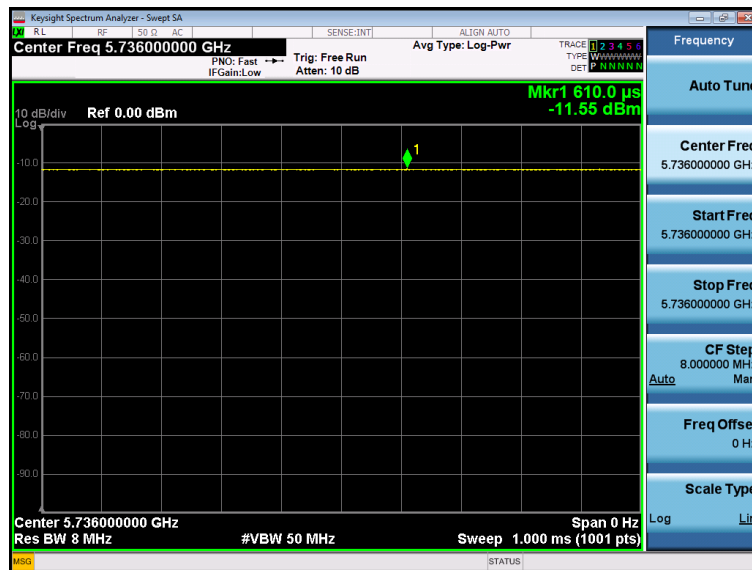
7.3 Test result

Frequency (MHz)	Output Power (dBm) ANT A	Output Power (dBm) ANT B	Total power (dBm)	FCC Limit (dBm)	Result
5736	-6.711	-7.572	-4.11	30	Pass
5762	-5.741	-6.984	-3.31	30	Pass
5814	-5.655	-6.816	-3.19	30	Pass

For 5.725-5.825GHz, the limit=1 W

NOTE: During the test the EUT is in 100% duty cycle transmitting.

Test plot of Duty Cycle



8. PEAK POWER SPECTRAL DENSITY TEST

8.1 Limits

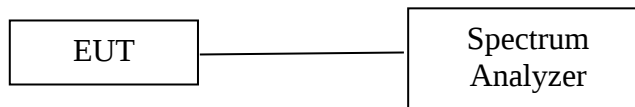
Band 5.725-5.825GHz:

FCC: In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band.

8.2 Test setup

Methods refer to FCC KDB 789033

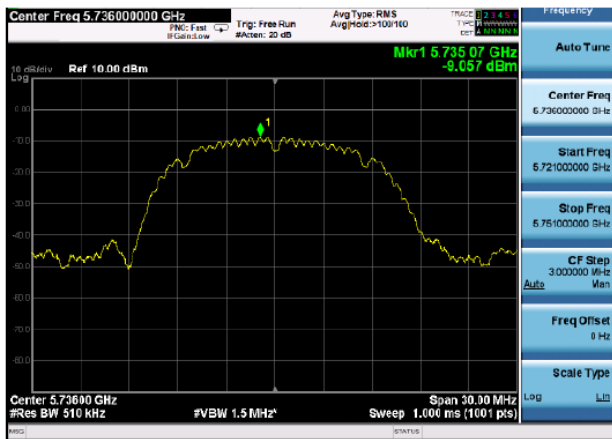
- 1) Create an average power spectrum for the EUT operating mode being tested by following the instructions in section E)2) for measuring maximum conducted output power using a spectrum analyzer or EMI receiver: select the appropriate test method (SA-3, or alternatives to each) and apply it up to, but not including, the step labeled, "Compute power...".
- 2) Use the peak search function on the instrument to find the peak of the spectrum.
- 3) The result is the PPSD.
- 4) The above procedures make use of 1 MHz resolution bandwidth to satisfy the 1 MHz measurement bandwidth specified in the 15.407(a)(5). That rule section also permits use of resolution bandwidths less than 1 MHz "provided that the measured power is integrated to show the total power over the measurement bandwidth" (i.e., 1 MHz). If measurements are performed using a reduced resolution bandwidth and integrated over 1 MHz bandwidth



8.3 Test data

Frequency (MHz)	Power Density. Antenna A	Power Density. Antenna B	Total power Density	FCC Limit (dBm/500KHz)
	(dBm/500KHz)	(dBm/500KHz)	(dBm/500KHz)	
5736	-9.057	-6.646	-4.68	30
5762	-9.333	-6.646	-4.77	30
5814	-9.626	-5.644	-4.18	30

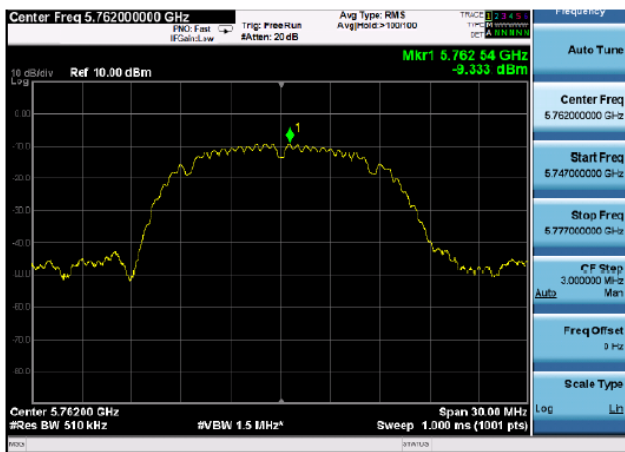
5736MHz-ANTA



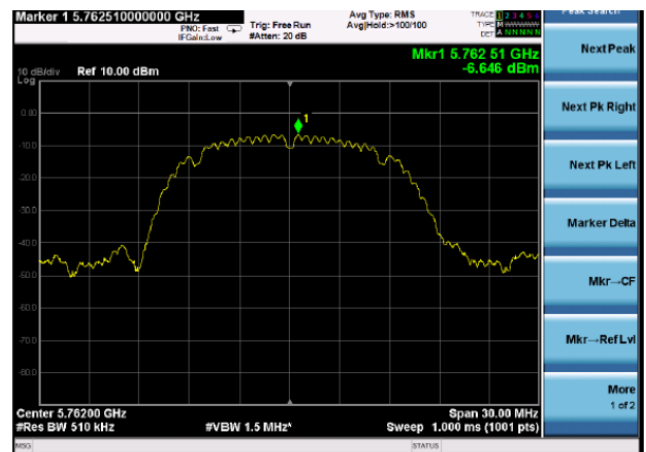
5736MHz-ANTB



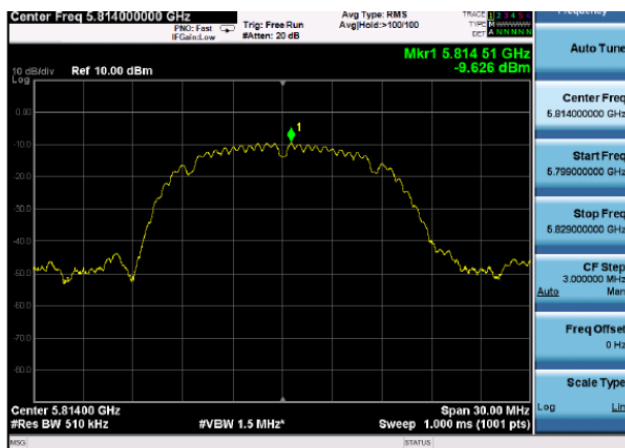
5762MHz-ANTA



5762MHz-ANT B



5814MHz-ANTA



5814MHz-ANT B

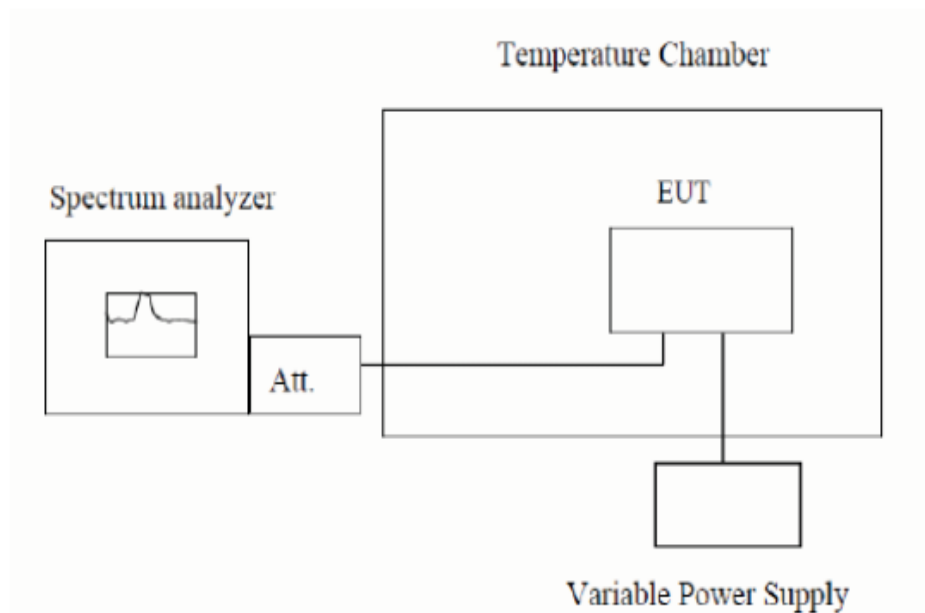


9. FREQUENCY STABILITY TEST

9.1 Limit

According to §15.407(g), manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.

9.2 Test Configuration



9.3 Test procedure

1. The transmitter output (antenna port) was connected to the spectrum analyzer.
2. EUT have transmitted absence of modulation signal and fixed channelize.
3. Set the spectrum analyzer span to view the entire absence of modulation emissions bandwidth.
4. Set RBW = 10 kHz, VBW = 10 kHz with peak detector and maxhold settings.
5. f_c is declaring of channel frequency. Then the frequency error formula is $(f_c - f)/f_c \times 10^6$ ppm and the limit is less than ± 20 ppm (IEEE 802.11 specification).
6. The test extreme voltage is to change the primary supply voltage from 85 to 115 percent of the nominal value
7. Extreme temperature rule is $-30^\circ\text{C} \sim 50^\circ\text{C}$.

9.4 Test data

Pass

10. ANTENNA REQUIREMENTS

10.1 Limits

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

10.2 Result

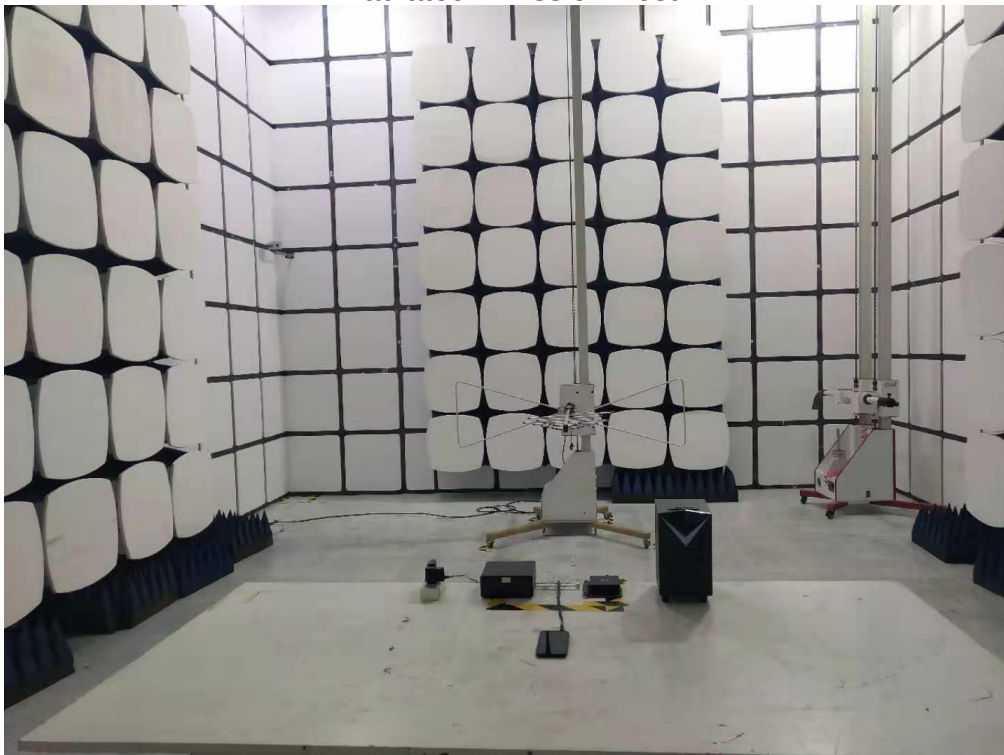
The antennas used for this product is PCB antenna and that no antenna other than that furnished by the responsible party shall be used with the device, the maximum peak gain of the transmit antenna is only 2.4dBi.

11. PHOTOGRAPHS OF TEST SET-UP

Conducted Emission



Radiated Emission Test





*** the end of report ***